REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-3 and 7-17 are presently active; Claims 4-6 were previously cancelled without prejudice or disclaimer, Claim 1 has been presently amended. No new matter has been added.

In the Office Action, Claims 1-3 and 7-17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Okase et al (U.S. Pat. No. 6,399,922) in view of Aoyama et al (U.S. Patent No. 5,651,827) and Shamouilian et al (U.S. Patent No. 6,440,221).

Claim Summary: Claims 1, 7, 13 and 14 as presently clarified defines:

> A substrate processing apparatus, comprising:
>
> a metal-walled processing vessel that defines a processing space and has a front side and a rear side;
>
> an ultraviolet light source that irradiates ultraviolet light into the processing vessel metal-walled processing vessel;
>
> a gas injection nozzle unit that is connected to the front side of the metal-walled processing vessel and is configured to inject gas into the metal-walled processing vessel so that the gas flows through the processing space in a gas-flow direction from the front side to the rear side;
>
> an opaque case made of quartz that covers an inner wall of the processing vessel metal-walled processing vessel and includes an opening arranged to face against the ultraviolet light source through which opening the ultraviolet light passes;
>
> a remote plasma part that is connected to the front side of the metal-walled processing vessel at which the gas injection nozzle unit is arranged and is configured to supply radicals to the metal-walled processing vessel through a supply line;
>
> a heater portion that heats a substrate introduced inside the opaque case to a predetermined temperature;

a holding member that holds the substrate above the heater portion; and

rotational drive means for rotating an axis of the holding member that penetrates through the heater portion,

wherein the gas injection nozzle unit is fitted into an opening formed at the front side of the processing vessel and include a plurality of injection openings that are arranged at predetermined intervals and aligned into one row that is parallel to a horizontal width direction of the processing space and perpendicular to the gas-flow direction.

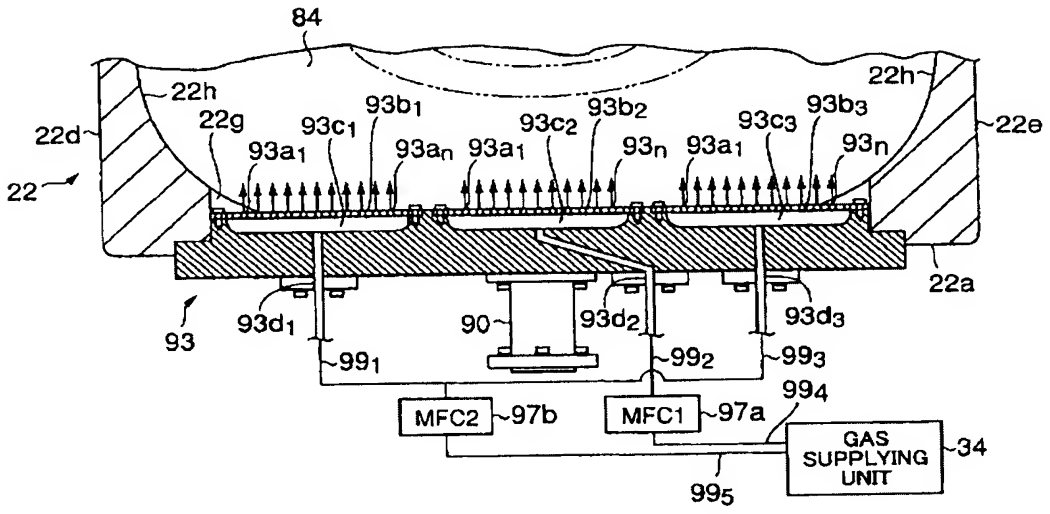
Regarding amended Claim 1, support for this amendment is found in Applicants' Figs. 10, 18, 19, in the corresponding descriptions in the specification (e.g., page 33, lines 2-11, and page 35, lines 14-25), and in original Claim 13. Thus, no new matter has been added.

Accordingly, Claim 1 has been clarified to recite (among other things) (1) a feature of "a remote plasma part that is connected to the front side of the metal-walled processing vessel at which the gas injection nozzle unit is arranged and is configured to supply radicals to the metal-walled processing vessel through a supply line" and (2) a feature of "wherein the gas injection nozzle unit is fitted into an opening formed at the front side of the metal-walled processing vessel and includes a plurality of injection openings that are arranged at predetermined intervals and aligned into one row that is parallel to a horizontal width direction of the processing space and perpendicular to the gas-flow direction".

Regarding the above-noted first feature (1), it is well known in the art that the term "remote plasma" means generating a plasma (radicals) in a remote place and supplying the plasma from the remote place to a processing vessel through a supply line. Indeed, the Applicant's Claim 1 defines a remote plasma part that is connected to a front side of a metal-walled processing vessel at which a gas injection nozzle unit is arranged and is configured to supply radicals to the processing vessel through a supply line.

Regarding the above-noted second feature, Applicants' specification (with reference to Figures 18-20 of which Figure 19 is reproduced below for the sake of convenience) indicates on page 35, lines 14-25, that, upon injecting gas into the processing space 84, the nozzle holes $93a_1$~$93a_n$ of the nozzle plates $93b_1$~$93b_3$ extending along the horizontal width direction of the front portion 22a of the processing vessel 22 are arranged to direct the gas injection throughout the entire width of the processing space 84. Thereby, the gas injected into the processing space 84 may flow from the front portion 22a to the rear portion 22b of the processing vessel 22 at a constant flow rate throughout the entire processing space 84.

FIG.19



Art Deficiencies: The asserted combination of Okase et al, Aoyama et al, and Shamouilian et al does not disclose or suggests all of the elements of independent Claim 1 for at least the following reasons.

In the Office Action, the Examiner associated the showerhead 72 in Figure 2 of Okase et al with the "gas injection nozzle unit" in the previously presented Claim 1. However, Okase et al do not disclose or suggest a gas injection nozzle unit including a plurality of

injection openings that are arranged at predetermined intervals and aligned into one row that is parallel to a horizontal width direction of the processing space and perpendicular to the gas-flow direction. The showerhead 72 in Figure 3 of Okase et al has a vertical downward gas flow direction (from the top to the bottom), and the gas spurting holes 80 are arrayed in the showerhead in a lattice formation.

Aoyama et al describe that susceptor 7 and heater 30a are disposed in the center region of a support table 3 and rotated by motor 3E (rotational drive means) as shown in Figure 6.

Shamouilian et al describe a plasma enhanced chemical vapor deposition (PECVD) chamber with four gas supply parts 50 at all four walls of the chamber as shown in Figure 2. Shamouilian et al describe at col. 7, lines 1-5, that "preferably the heater 150 comprises a plurality of radiant heat lamps 168, such as tungsten halogen lamps distributed across the surface of the ceiling 40, to provide a uniform radiation per unit surface area across the ceiling." Namely, the teaching of Shamouilian et al is directed to arranging a plurality of radiant heat lamps across the surface of the ceiling to provide a uniform radiation per unit surface area across the ceiling.

Accordingly, the asserted combination of Okase et al, Aoyama et al, and Shamouilian et al does not disclose or suggest the above-noted feature of Claim 1 concerning the gas injection nozzle unit.

In the Office Action on page 3, the examiner acknowledged that Okase et al and Aoyama et al do not teach a remote plasma part. Instead, the examiner apparently considered antenna elements 125 in Shamouilian et al to constitute a coil for a remote plasma part. Yet the antenna elements 125 (in both Figures 1, 2, and 3 where they are shown) are placed on the outside of the container walls. Figure 1 shown below shows one of the plasma configurations. As such, there is no supply tube as claimed. Furthermore, one of ordinary

skill in the art at the time of the invention would not have considered the configurations in Figures 1, 2, and 3 of Shamouilian et al to be a remote plasma configuration.

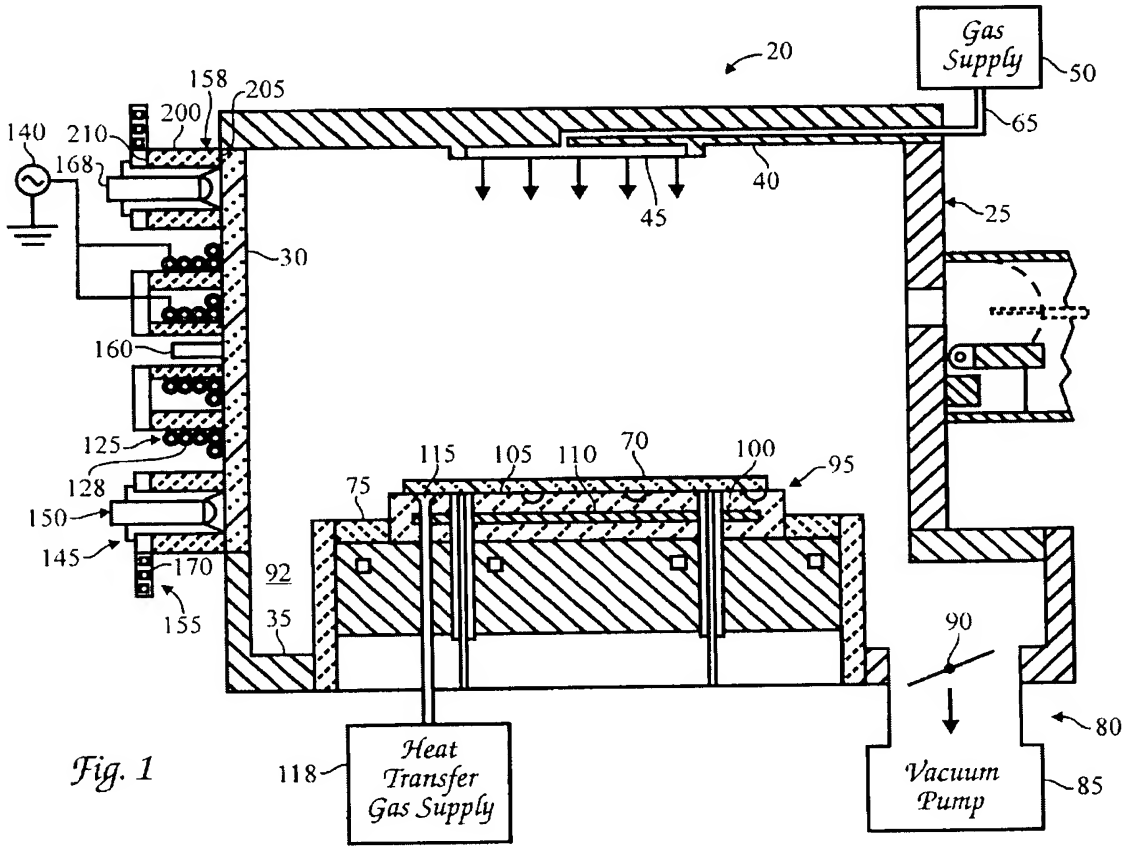


Fig. 1

Thus, neither Okase et al nor Aoyama et al nor Shamouilian et al disclose or suggest a "remote plasma part to supply radicals to the processing vessel through a supply line, which remote plasma part is connected to a front side of a processing vessel at which a gas injection nozzle unit is arranged" as recited in Claim 1.

Accordingly, the asserted combination of Okase et al, Aoyama et al, and Shamouilian et al does not disclose or suggest the above-noted feature of Claim 1 concerning the remote plasma part.

For the above-noted deficiencies in the art, withdrawal of the 35 U.S.C. 103(a) rejection is respectfully requested. Claims 1-3 and 7-17 should be passed to allowance.

Conclusion: In view of the present amendment and in light of the above discussions, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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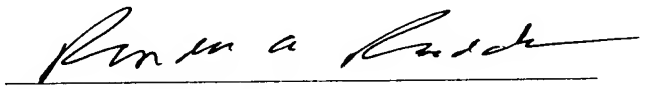

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